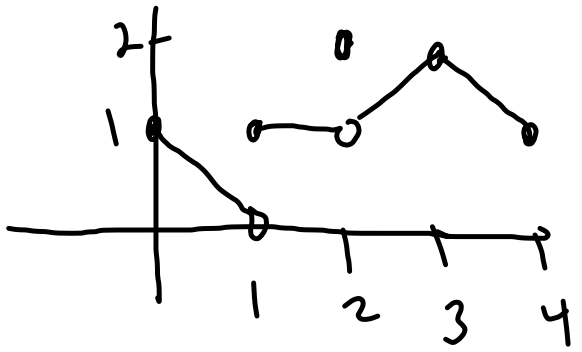
2.3 continuity – def p79



f is cont at $x=c$ if $\lim_{x\to c} f(x) = f(c)$ (① ③ ②)

where is $f(x)$ discontinuous?

① $\lim_{x\to 2} f(x) = 1$

② $f(2) = 2$

③ same? no

$x=1$ & $x=2$

$x=1$: jump disc.

$x=2$: hole (removable disc)

$\lim_{x\to 1} f(x) = \nexists$ dne

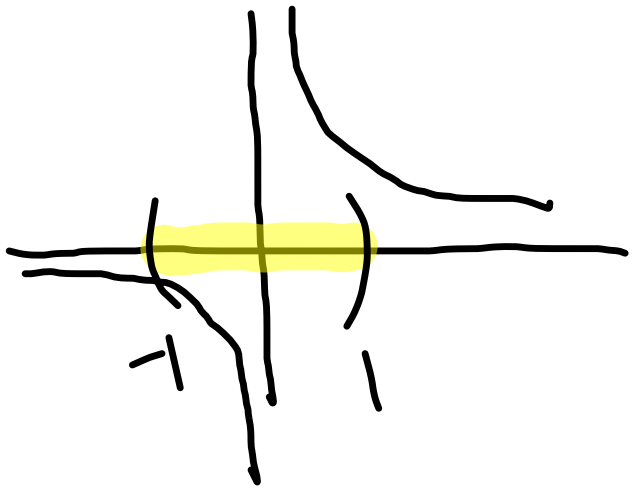
fails step 1

where is $f(x)$ continuous?

use interval notation

$$[0,1) \cup (1,2) \cup (2,4]$$

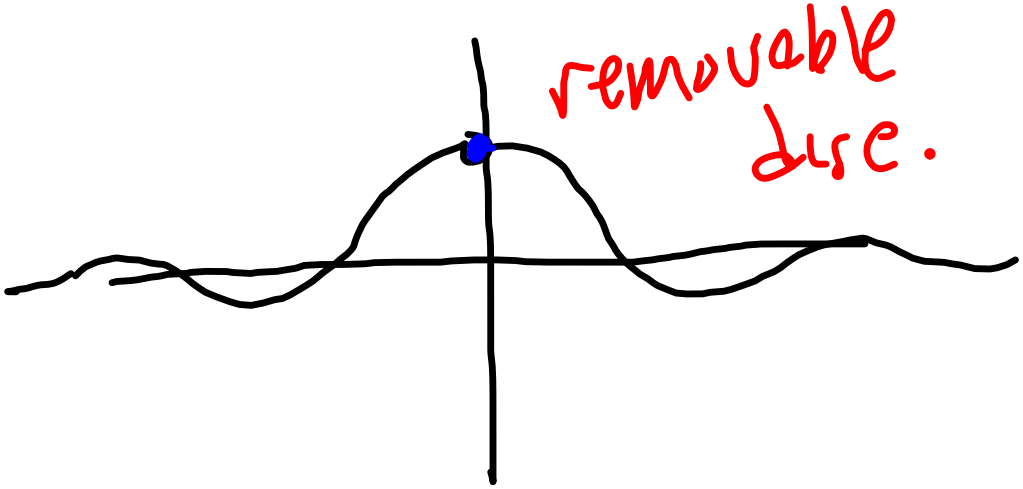
is $y = \frac{1}{x}$ continuous on $(-1,1)$



not cont at $x=0$

infinite disc.

$y = \frac{\sin x}{x}$



disc. at $x = 0$

extend the function def.

continuous extension

$$y = \begin{cases} \frac{\sin x}{x} & x \neq 0 \\ 1 & x = 0 \end{cases}$$

old

find the continuous extension of

$$y = \frac{x^2-4}{x-2} = \frac{(x-2)(x+2)}{(x-2)}$$

hole at $x=2$

$$\lim_{x\to 2} \frac{x^2-4}{x-2} = 4$$

$$f(x) = \begin{cases} \frac{x^2-4}{x-2} & x \neq 2 \\ 4 & x = 2 \end{cases}$$

$(2, 4)$